Practice: 657 - Wetland Restoration

Scenario: #1 - Drain Tile Plug

Scenario Description:

A Mineral Flat wetland is to be restored. The tract size is 25 Acres consists of surface saturated soils interspersed with shallow depressions that are not depressional class HGM wetlands. The wetland size is also 25 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has been drained with a tile drain system. A suitable seed bank exists for natural regeneration to re-establish hydrophytic vegetation. The site is in agricultural production.

After Situation:

The drain tiles have been rendered non-functional by excavating 50 foot lengths of tile mains and laterals in 25 separate locations, and backfilling with excavated earth, which is compacted with the excavator bucket. There are no facilitating practices. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Scenario Feature Measure: Feet of tile excavated/plugged

Scenario Unit: Foot

Scenario Typical Size: 1,250

Scenario Cost: $2,702.44 **Scenario Cost/Unit:** $2.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$130.06	10	$1,300.60
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$28.85	10	$288.50
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$556.67	2	$1,113.34

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Scenario: #2 - Riverine Levee Removal

Scenario Description:

A Riverine HGM tract on a large floodplain is to be restored. It has been converted to agricultural production by surface ditching and clearing of woody vegetation. A 6 foot high, 80 foot wide levee prevents flood waters from entering the wetland to be restored. Lateral connectivity between the channel and floodplain is restored by excavating 2 sections, totaling 300 feet, from the levee at an upstream and downstream location, restoring dynamic stream flooding. About 5400 cubic yards of earth has been removed from the levee and trucked off-site. Both the wetland and non-wetland areas are planted with a Bottomland Hardwood species mix. The levee breaches are armored with rock riprap. Facilitating practices include Grade Stabilization Structure and Tree and Shrub Planting, critical area planting, and conservation cover.

Before Situation:

A levee prevents floodwater from entering the tract. The original cover was forest. The site has been completely cleared, and no suitable adjacent seedwall exists for natural regeneration of forest species. The lateral connectivity between the channel and floodplain has been altered by construction of levees along the reach. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11-WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

After Situation:

Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Scenario Feature Measure: Cubic Yard of Levee Removed

Scenario Unit: Cubic Yard

Scenario Typical Size: 5,400

Scenario Cost: $20,226.03 **Scenario Cost/Unit:** $3.75

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$130.06	55	$7,153.30
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	$138.25	55	$7,603.75
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.97	55	$1,263.35
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$28.85	55	$1,586.75
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$556.67	4	$2,226.68
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	$196.10	2	$392.20

Practice: 657 - Wetland Restoration

Scenario: #3 - Depression Sediment Removal (Pothole)

Scenario Description:

Restore depressional areas (potholes) to a land-leveled wetland. Construct 10 potholes throughout project area. Potholes are of irregular shape and average 5,000-10,000 sf in size. Spoil is spread on surrounding area. Using critical area planting (342) practice, disturbed areas are vegetated to control erosion with plants native to the area.
Associated practices: Critical area planting (342), conservation cover (327) and mulching (484).

Before Situation:

The wetland has been converted to agricultural production, with land leveling and erosion filling depressional areas. Depressional areas filled with an average 18 inches of soil, leaving area devoid of shallow water. Inadequate habitat for migrating, nesting and foraging waterfowl and other wildlife. High water table in the area indicates good suitability for restoration of depressional areas.

After Situation:

An average of 18 inches of material has been excavated from depressional areas. Depressions are re-spread with topsoil to supply organic material for seeding and restoring the depression. Ten depressions (potholes) have been restored throughout project area. Depressions are of irregular shape and average 5,000-10,000 sf in size. Spoil is spread or shallowly mounded on surrounding area. Using critical area planting (342) practice, disturbed areas are vegetated to control erosion with plants native to the area. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will address inadequate habitat for fish and wildlife, degraded plant condition and water quality degradation concerns listed above.

Scenario Feature Measure: Number of depressional areas excavated

Scenario Unit: Each

Scenario Typical Size: 10

Scenario Cost: $38,052.34 **Scenario Cost/Unit:** $3,805.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$217.41	150	$32,611.50
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$28.85	150	$4,327.50
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$556.67	2	$1,113.34

Practice: 657 - Wetland Restoration

Scenario: #5 - Riverine Channel and Floodplain Restoration

Scenario Description:

A Riverine HGM landscape on a small stream on a low stream order riparian landscape has been converted to agricultural production. The stream channel has degraded. The reach is 1500 feet in length, and the tract size is 15 acres. The wetland area is 10 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

Channel incision has broken the lateral connectivity between the stream and floodplain. The coversion to cropland was accompanied by filling and leveling of backswamp, side channel, and oxbow features which formerly ponded water or exposed the floodplain groundwater table. The site no longer has access to floodwater or water surface profile supported groundwater. No suitable seed bank exists for natural regeneration of the original hydrophytic plant community, either in the channel, or on the floodplain.

After Situation:

The hydrology of the site is restored by the installation of a series of rock check structures to raise the stream water surface profile. Floodplain macrotopographic features replicating the original side channels, oxbows, and backswamps are constructed by excavation. Spoil is placed adjacent to the excavations to replicate natural depositional features. The average depth of the excavated features is 2 feet, and the surface area of the excavations is 25% of the tract size. The eroding stream bank is stabilized with soil bio-engineering features, and fish habitat improvement measures are installed in the channel. The tract is seeded to appropriate hydrophytic and upland vegetation, both woody and herbaceous. Facilitating practices are Streambank and Shoreline protection, Structure for Water Control, Conservation Cover, Tree/Shrub Establishment, and Stream Habitat Improvement and Management. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Scenario Feature Measure: Acres of Tract

Scenario Unit: Acre

Scenario Typical Size: 15

Scenario Cost: $8,252.34 **Scenario Cost/Unit:** $550.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.36	3025	$7,139.00
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$556.67	2	$1,113.34

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Scenario: #7 - Hydrologic restoration with embankment or ditch plug

Scenario Description:

An agricultural area drained with surface ditches is restored to the natural hydrologic conditions by plugging surface drainage with either a low embankment or ditch plugs. Material is excavated on-site. Excavated areas become shallow depressions within the restored wetland.

Associated practice(s): Structure for Water Control, Tree and Shrub Planting, Herbaceous Riparian Buffer, Forest Riparian Buffer, Mulching

Before Situation:

Typically an agricultural area that was once wetland has altered the soil, vegetation, or hydrologic conditions. The natural hydrology was disabled by surface drainage.

After Situation:

Area now has hydrology restored. The surface ditches have been disabled. Embankment or ditch plugs constructed using on-site material excavated to create shallow depressional areas in the restored wetland. A low, 3 foot high, 250 ft long embankment or series of ditch plugs is created from material excavated on site.

Scenario Feature Measure: Feet of low embankment or ditch plug

Scenario Unit: Foot

Scenario Typical Size: 250

Scenario Cost: $8,290.38 **Scenario Cost/Unit:** $33.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$130.06	20	$2,601.20
Dozer, 105 HP	1320	Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included.	Hour	$94.47	20	$1,889.40
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$41.91	10	$419.10
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$28.85	40	$1,154.00
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$556.67	4	$2,226.68